

## CLAIMS

What is claimed is:

1. A micro cooling and power supply structure, comprising:

an emitter end chip having an emitting surface;

5 a collector end chip having a collecting surface that corresponds to and is separated from the emitting surface; and

a plurality of micro cantilever beam components formed on the emitting surface, wherein each of the micro cantilever beam components at least has a projecting part that serves as an electron emitter on the emitting surface, a sensing component for sensing a distance between the projecting part and the collecting surface, and an actuating component for maintaining a predetermined distance between the projecting part and the collecting surface according to the distance sensed by the sensing component.

15 2. The micro cooling and power supply structure of claim 1, wherein the plurality of micro cantilever beam components are formed on the emitting surface of the emitter end chip in the use of a micro engineering technique.

3. The micro cooling and power supply structure of claim 1, wherein the micro cantilever beam components are arranged in an array over the entire emitting surface.

20 4. The micro cooling and power supply structure of claim 1, wherein the predetermined distance maintained between the projecting part and the collecting surface is an optimal distance for emitted electrons to produce an electron tunneling effect.

25 5. The micro cooling and power supply structure of claim 1, wherein the projecting part is a pyramidal projection formed in accordance with a lattice orientation of the micro cantilever beam component.

6. The micro cooling and power supply structure of claim 1, wherein the sensing component comprises a sensor and a corresponding sensor circuit.
7. The micro cooling and power supply structure of claim 1, wherein the actuating component comprises an actuator and a corresponding actuator circuit.
- 5 8. The micro cooling and power supply structure of claim 6, wherein the sensor is one selected from the group consisting of piezo-resistant, capacitive, inductive, optical, and electron tunneling micro sensors.
9. The micro cooling and power supply structure of claim 7, wherein the actuator is one selected from the group consisting of piezo-electric, capacitive, inductive,  
10 electrostatic, magnetic, memory alloy, and heat-generating micro actuators.
10. The micro cooling and power supply structure of claim 1, wherein the emitting surface is parallel to the collecting surface.
11. The micro cooling and power supply structure of claim 1, wherein the emitting surface is separated from the collecting surface by a distance of nanometer scales.
- 15 12. The micro cooling and power supply structure of claim 1, wherein a vacuum insulation layer is disposed between the emitting surface and the collecting surface.
13. The micro cooling and power supply structure of claim 1, wherein a potential difference is applied across the emitter end chip and the collector end chip to allow electrons on the emitting surface to produce an electron tunneling effect and move  
20 to the collecting surface so as to form a micro cooling mechanism.
14. The micro cooling and power supply structure of claim 1, wherein the emitter end chip absorbs heat from a heat source to allow electrons to produce an electron tunneling effect and move to the collecting surface so as to form a micro power supply mechanism.